

CLAIM(S)

What is claimed is :

- 5 1. A melt spinning process for spinning polymeric filaments, comprising
passing a polymeric melt of a polymer formed from one or more chain-branching agents through a spinneret to form polymeric filaments,
10 passing the filaments to a pneumatic quench zone, wherein a cooling gas is provided to the filaments to cool the filaments, wherein the cooling gas is directed to travel in the same direction as the direction of the filaments.
- 15 2. A process as claimed in claim 1, wherein the cooling gas is provided to the filaments in a single stage and passes through a tapered section and a zone of restricted dimensions to accelerate the gas.
- 20 3. A process as claimed in claim 1, wherein the cooling gas is provided to the filaments in two stages, and wherein the gas is accelerated by a converging section in the quench zone.
- 25 4. A process as claimed in claim 1, further comprising gathering the filaments to form a yarn.
5. A process as claimed in claim 1, wherein the
30 polymer comprises a polyester.
6. A process as claimed in claim 1, wherein the polymer comprises polyethylene terephthalate.

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7. A process as claimed in claim 1, wherein the chain branching agents comprise a tri or higher functional acid, alcohol, or ester.

5 8. A process as claimed in claim 1, wherein the chain branching agent comprises trimethyl trimellitate.

9. A process as claimed in claim 1, wherein a yarn formed from the produced filaments has a denier spread
10 of less than about 2 and the filaments have a denier per filament of greater than about 4.

10. A process as claimed in claim 1, wherein a yarn formed from the produced filaments has a denier spread
15 of less than about 1.5 and a denier per filament of less than about 4.

11. A process as claimed in claim 1, wherein the polymer has a laboratory relative viscosity of above
20 22.

12. A process as claimed in claim 1, wherein the filaments travel through the quench zone at a speed of greater than about 3,500 meters per minute.

25 13. A process as claimed in claim 1, wherein the filaments travel through the quench zone at a speed of greater than about 4,000 meters per minute.

30 14. Filaments produced by the process of claim 1.

15. An article formed from the filaments of claim 14.

16. A melt spinning process for spinning polymeric filaments, comprising

- 5 passing a polymeric melt of a polymer through a spinneret to form polymeric filaments having a denier per filament above about 4,
- passing the filaments to a quench zone, wherein a cooling gas is provided to the filaments to cool the filaments, wherein the cooling gas is directed to travel and accelerated in the same direction as the
- 10 direction of the filaments,
- whereby a yarn formed from the produced filaments has a denier spread of less than 2.

17. A melt spinning process as claimed in claim 16,
- 15 wherein the filaments have a denier per filament above about 5.

18. A melt spinning process as claimed in claim 16,
- wherein the polymer comprises polyethylene
- 20 terephthalate.

19. A melt spinning process for producing polymeric filaments having a denier spread of below about 2, comprising
- 25 passing a polymeric melt of a polymer having a laboratory relative viscosity above 22.5 through a spinneret to form polymeric filaments,
- passing the filaments to a quench zone, wherein a cooling gas is provided to the filament array to cool
- 30 the filaments, wherein the cooling gas is directed to travel and accelerated in the same direction as the direction of the filaments.

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20. A method of producing polyester yarn have a denier spread of less than about 2%, comprising forming filaments from a polyester containing one or more chain-branching agents having a laboratory relative viscosity above 22.5, and forming the filaments into a yarn.
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